

REMARKS

Favorable reconsideration of this application in light of the following discussion is respectfully requested.

Claims 1-13 and 15 are currently pending in the present amendment. Claims 1, 4, 5, and 7 are amended by the present response. Support for the amendments to the claims can be found in the disclosure as originally filed. Thus, no new matter is added.

In the outstanding Office Action, Claims 1-13 and 15 were rejected under 35 U.S.C. §103(a) as being unpatentable over Gorsuch et al. (U.S. Patent No. 6,388,999, herein Gorsuch) in view of Lodha et al. (U.S. Published Patent Application No. 2003/0223430, herein Lodha) and Benveniste (U.S. Published Patent Application No. 2002/0163933).

With regard to the rejection of Claims 1-13 and 15 under 35 U.S.C. §103(a) as unpatentable over Gorsuch in view of Lodha and Benveniste, the Applicants respectfully traverse this rejection. Claim 1 has been amended to recite,

allocating, at the central controller, a predetermined amount of bandwidth to a certain connection requiring a certain quality of service, wherein an *owner* of said certain connection is a requesting terminal which *is a terminal* of said ad-hoc network, and the predetermined amount of bandwidth is allocated based on a fixed capacity allocation;

freeing, at the central controller, a certain amount of the allocated predetermined amount of bandwidth as freed bandwidth, said certain amount of freed bandwidth being a difference between the allocated predetermined amount of bandwidth and an indicated needed amount of bandwidth indicated *by said owner*, wherein said indicated needed amount of bandwidth does not exceed said predetermined amount of bandwidth.

The outstanding Office Action states on page 3 that Gorsuch does not describe “freeing, at the central controller, a certain amount of the allocated predetermined amount of bandwidth as freed bandwidth, said certain amount of freed bandwidth being a difference between the allocated predetermined amount of bandwidth and an indicated needed amount

of bandwidth indicated **by said owner.**” (emphasis added) Claim 1 has been amended to clarify that the owner is the *terminal* and that the terminal indicates the needed amount of bandwidth which shall be freed. The preamble of Claim 1 further clarifies that the central controller allocates the bandwidth by reciting that the “method is implemented in a central controller of an ad-hoc network.”

The Lodha reference describes allocating bandwidth between a plurality of queues in order to schedule packets out of a multi-queue system. Lodha does not cure the defects of Gorsuch, because Lodha describes one side of a communication system and does not describe any interaction from the outside of the multi-queue system. Consequently, Lodha does not describe “freeing, at the central controller, a certain amount of the allocated predetermined amount of bandwidth as freed bandwidth,” and “when said owner indicates a new needed amount of bandwidth greater than said indicated needed amount, immediately returning as much of the freed bandwidth as required so that said new needed amount of bandwidth is available to said owner,” as recited in amended Claim 1.

The Benveniste reference does not cure the defects of Gorsuch and Lodha because it too does not describe “freeing, at the central controller, a certain amount of the allocated predetermined amount of bandwidth as freed bandwidth,” and “when said owner indicates a new needed amount of bandwidth greater than said indicated needed amount, immediately returning as much of the freed bandwidth as required so that said new needed amount of bandwidth is available to said owner,” as recited in amended Claim 1.

Since Gorsuch, Lodha and Benveniste do not describe “when said owner indicates a new needed amount of bandwidth greater than said indicated needed amount, immediately returning as much of the freed bandwidth as required so that said new needed amount of bandwidth is available to said owner,” a person of ordinary skill in the art could not properly combine these references to arrive at the invention defined by Claim 1.

Further, with regard to motivation to combine the Gorsuch and Lodha references, the outstanding Office Action states on page 4 that “it would have been obvious to the one skilled in the art at the time of the invention to use the burrowing method of Lodha of the unused bandwidth into the method [described in] Gorsuch for the purpose of re-allocating unused bandwidth and therefore *increase the efficiency of the system.*” (emphasis added) Applicants respectfully traverse this position. As explained below, the combination proposed by the Office would *decrease* the efficiency of the resulting system.

Gorsuch describes the dynamic allocation of bandwidth between a base station and a plurality of subscriber units and a channel resource assigner in the base station which determines, on the basis of buffer information for the plurality of forward and reverse links, an urgency factor for each data source.¹ The urgency factor for each buffer is based upon statistical information and conditional probabilities.² Once an urgency factor for each buffer has been computed, the channel resource assigner determines how to allocate the available channels among the buffers.

Lodha describes a packet based traffic forwarding system with a plurality of contending (parallel) queues, each queue having an allocated bandwidth and an associated burrow vector. When a first queue does not consume all of its allocated bandwidth the burrow vector associated with a second queue is checked to determine whether the second queue is permitted to use the unconsumed and allocated bandwidth in the first queue.

The method described in Lodha of bandwidth allocation is incompatible with the channel resource allocator described in Gorsuch, because bandwidth allocation can be allocated either on Lodha’s burrowing mechanism or on Gorsuch’s urgency factor. Since Lodha does not describe an uplink channel while Gorsuch describes optimizing both an uplink and an downlink of a channel, one skilled in the art would not be motivated to

¹ See Gorsuch, Col. 8, lines 35-44.

² See Gorsuch, Col. 8, lines 53-55.

combine the burrowing method described in Lodha with the channel resource allocator described in Gorsuch.

In addition, Lodha's description of "unused bandwidth" is tied to fixed-links transmission frames associated to individual channels, where the frames are not completely used. In contrast, Gorsuch describes a method that utilizes only variable frames, the length of which is adapted in accordance with the urgency factor such that only such bandwidth which is not required at all is needed.³ Combining Lodha with Gorsuch would *decrease* the efficiency of the method describe in Gorsuch, thus teaching away from the motivation asserted on page 4 of the outstanding Office Action to "increase the efficiency of the system." Thus, a person of ordinary skill in the art would not combine Lodha with Gorsuch in order to increase the efficiency of the system.

Moreover, page 4 of the outstanding Office Action states that "it would have been obvious to the one skilled in the art at the time of the invention to use the method of Gorsuch and Lodha in an ad-hoc network for the purpose of having the advantage of adding quickly new devices and wherein the devices can communicate with each other in a direct way without the need of access point." Applicants respectfully disagree with this position because Gorsuch describes a network including a base station having a channel resource assigner and a plurality of subscriber units.⁴ The base station alone includes the channel resource assigner, and without a channel resource assigner no bandwidth reallocation is possible. Thus, when two of the base stations described in Gorsuch form an ad hoc network there is no base station where each participant could act as a master or slave as described in Gorsuch.

In view of the above-noted distinctions, Applicants respectfully submit that Claim 1 (and any claims dependent therefrom) patentably distinguish over Gorsuch, Lodha and Benveniste. Claims 4, 7, and 10 recite elements analogous to those of Claim 1. Thus, these

³ See Gorsuch, Col. 6, lines 28-30.

⁴ See Gorsuch Fig. 3.

claims are distinguished for at least the reasons explained above in regard to amended Claim 1.

Claim 2 further patentably distinguishes over Lodha because step 408 of Fig. 4B of Lodha does not describe two classes of connections.⁵ Therefore Lodha does not describe “allocating some or all of said certain amount of free bandwidth to a connection without quality or service requirements, the connection being a connection of the ad-hoc network,” recited in Claim 2. Thus, Claim 2 further patentably distinguishes over Lodha.

Claim 3 further patentably distinguishes over Gorsuch because Gorsuch describes that each subscriber unit periodically reports buffer characteristics back to a base station.⁶ On receipt of this buffer characteristic information, the channel resource assigner determines an urgency factor and, using these urgency factors, the channel resource assigner dynamically assigns an optimum number of channel resources which each subscriber unit may use. Thus, Gorsuch describes that *buffer characteristics are indicated* to a central controller and the needed amount of bandwidth is determined by said central controller. In contrast, Claim 3 recites “wherein said requesting terminal is operated by reserving a predetermined *amount of bandwidth* for providing a certain quality of service for said connection.” Thus, Claim 3 further patentably distinguishes over Gorsuch.

Claim 5 further patentably distinguishes over Lodha because Lodha is silent on the terminal side. Lodha does not describe “operating said central controller by allocating a predetermined amount of bandwidth to a certain connection requiring a certain quality of service, wherein an owner of said certain connection is a requesting terminal which *is a terminal* of said ad-hoc network,” as is recited in amended Claim 5. Thus, Claim 5 further patentably distinguishes over Lodha.

⁵ See Lodha Fig. 4B, step 408.

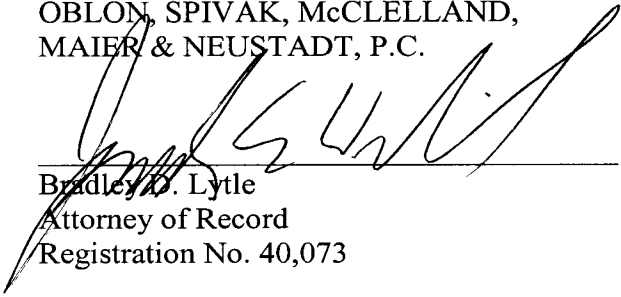
⁶ See Gorsuch col. 7, lines 32-33.

Claim 10 further patentably distinguishes over Lodha, Gorsuch and Benveniste because they do not describe “a monitoring means for monitoring a filling status of said transmit queue and sending out a request signal to said central controller indicating a ***needed amount of bandwidth***,” as recited by Claim 10. As noted above in regard to Claims 1 and 3, the Gorsuch reference describes only subscriber units configured to send buffer information. Thus, Claim 10 further patentably distinguishes over Lodha, Gorsuch and Benvenist.

Consequently, in light of the above discussion the present application is believed to be in a condition for allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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